

ROCHESTER HISTORY

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VOL. VIII

OCTOBER, 1946

No. 4

When Science Was On Trial in Rochester: 1850-1890

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The development of a scientific outlook was a major achievement of the second half of the nineteenth century. The Darwinian hypothesis, appearing in 1859, stimulated a reorganization of earlier accumulations of descriptive knowledge and forced a reappraisal of older speculative philosophies. Thoughtful men everywhere began to ponder anew the origin and nature of life and society. In Rochester, where an intellectual community had already taken root, nurturing and in turn being nurtured by the university, the theological seminary, and a number of cultural associations, fruitful contributions were to be made in many scientific fields. A plan to make the university a great scientific laboratory failed to mature, yet the city did become a productive center of scientific growth, not, however, without experiencing repeated outbreaks of the current strife between science and theology. The story of these developments in this small and still provincial city is full of significance as well as drama, for the real test of new ideas is not their appeal to a few individuals but their acceptance and development within the community.

The Cultural Background

Rochester's character as a sober religious community had slowly emerged during its first half century of growth. Recurrent periods of evangelical and denominational fervor had provided the city of 36,403 with 39 churches by 1850; after repeated failure by other sects, the

ROCHESTER HISTORY, published quarterly by the Rochester Public Library, distributed free at the Library, by mail 25 cents per year. Address correspondence to the City Historian, Rochester Public Library, 115 South Avenue, Rochester 4, N.Y.

Baptists successfully established a university and theological seminary that year. Educated ministers predominated among the clergy, while pious laymen, active in the Bible, tract, and missionary societies, the Sabbath schools, temperance and anti-slavery movements, were accumulating libraries and supporting educational institutions.¹ No citizen was more respected than Dr. Chester Dewey whose four D.D.'s and weekly supply sermons engendered confidence in his scientific work, thus opening the way for new intellectual developments.

Interest in the natural and physical sciences was patiently cultivated by Dr. Dewey, first at the Collegiate Institute over which he assumed control in 1836, and after 1850 at the university. His zeal for botanical collections, and indeed the enthusiasm with which he responded to curious minds in any field, stimulated many young men to scientific endeavors. Dewey's first series of popular lectures on chemistry in 1837, his attempt three years later to harmonize the Biblical account of creation with Lyell's new geological discoveries by endorsing the concept of geologic days, his campaign in 1843 for a telescope and five years later for a microscope, and his long service, from 1837 to 1867, in the tabulation of daily weather reports, foreshadowed many of the scientific trends in Rochester during the next half century. Although he was 66 years old when the university opened, eighteen busy and useful years lay ahead.²

The Athenaeum and Mechanics Association, which Dr. Dewey likewise served in many capacities—for a long period selecting the speakers invited to appear on its winter programs—made a vital contribution to the city's intellectual life. The favor accorded the occasional lecturer on science in the early years prompted an arrangement in 1854 for a special course of scientific lectures to be given by the great European scientist, Louis Agassiz, recently appointed professor at Harvard. The experiment proved so successful that Professor Benjamin Silliman of Yale was brought to Rochester for ten lectures the next year. Special scientific courses were offered by the Athenaeum for a number of years until, late in the Civil War, no competent lecturer could be engaged. Moreover, the Athenaeum library, the principal reliance of many readers, listed 154 books on natural science in 1854 when the total number of volumes was 7000. With books by Charles Lyell, T. R. Malthus, Louis Agassiz and even Charles Darwin (*Journal of a Naturalist*) thus available, interested students could keep in touch with contemporary scientific developments.³

Another organization which Dr. Dewey helped to establish, the Club (or Pundit Club as it was specifically named), provided a more

intimate fellowship to a select group of scholars. Lewis Henry Morgan, whose first book, *The League of the Iroquois*, was already attracting praise from widely scattered scientists, took the initiative by inviting a half-dozen of the city's most learned men to his home for the first meeting in July, 1854. Soon the membership was increased to sixteen, providing a choice audience as well as varied intellectual repasts. The literary and theological interests manifest in some of the papers were balanced by the scientific tenor evident in the majority. Indeed the Club served a seminal function, nurturing the creative energies of its members, none more fruitfully than those of Lewis H. Morgan.⁴

The Club's first paper dealing specifically with the natural sciences was read by Dr. Dewey at the last meeting of the initial season. His topic, "The Difficulty of Locating Man in the present Zoological System," was but the first of a series in which Cuvier's classification of the animal kingdom and the new theories advanced by Agassiz were soberly considered. The papers themselves have disappeared, but Dr. Dewey's staunch belief in the unity and equality of mankind and in the permanence of species never faltered, and we can well imagine how disturbed he must have been over the contrary views propounded by Agassiz in the late fifties.⁵

The issue attracted intense interest as the debate over slavery approached the crisis of civil war. If Agassiz's hypothesis was correct and the existence of distinct varieties of man (springing from separate pairs of parents, perhaps at separate times, and developing independently) could be established, the argument in behalf of slavery would be strengthened. Old Professor Dewey, though friendly toward Agassiz, could not accept such a theory; nor could Martin B. Anderson, president of the university, who attacked the hypothesis in a paper on "The Objections urged against the Unity of the Human Race." Anderson, if we may judge from a reference in a later paper by Morgan, relied upon scriptural evidence to refute Agassiz, but young Dr. Edward Mott Moore placed samples of human blood and other cells under the microscope to find "The Evidence of the Unity of the Human Race drawn from Anatomical Facts."⁶

Few in Rochester were aware of these provocative discussions, which took place in the homes of the club members, but their influence was, nonetheless, far reaching. Lewis H. Morgan, founder of the Club, in whose book-lined library the annual season was opened each October, was marvelously stimulated thereby. His youthful curiosity about Indians

had already blossomed into a noteworthy book on the Iroquois, and the knowledge gained in its preparation of their language, customs, and institutions now suggested the interesting possibility that a comparative study of the laws of descent and other fundamental customs among all tribes in America might supply data that could be used in connection with similar evidence on Asiatic peoples to determine the origin of the American Indian. This fascinating project was first conceived during a business venture in the territory of the Ojibawa Indians of Wisconsin in the summer of 1858; but the Pundit discussions of Dewey's papers and perhaps a reading of Agassiz's *Essay on Classification*, published that year, must have prepared the way for the inspiration.⁷

And what an inspiration it was! Morgan's paper the next May on "Agassiz's Theory of the Origin of the Human Race" reveals how his early research pastime came to assume scholarly significance. He declares that neither scriptural references nor anatomical data could be relied upon to answer Agassiz's hypothesis; what the scientist needed was anthropological evidence, and he proposed to collect data on native tribal and family relationships from all parts of the world, and thus to prove or disprove the hypothesis of separate varieties of man. The announcement must have sent a tremor of enthusiasm through his fellow Pundits, for the next year four papers dealt with the nature of species.⁸

Morgan's new project quickly assumed large proportions. An elaborate questionnaire was prepared for distribution to competent observers—a novel procedure in that day. The cooperation of the Smithsonian Institution facilitated the mailing of copies to consular agents in all parts of the world. Soon a stream of letters was coming back to Morgan in Rochester, and while but few of them supplied the exact data he sought, a fruitful correspondence was developed with interested scholars. His enthusiasm mounted when evidence supporting his theory arrived from a missionary in southern India. An expedition was organized, eventually several of them, to various western tribes. Slowly a mass of evidence was accumulated, forming the basis for Morgan's epochal study of "Consanguinity and Affinity," completed in 1867 and published in a monumental volume by the Smithsonian Institution three years later.⁹

In addition to this significant project, conceived and launched before word of Darwin's theories reached Rochester, other important scientific developments were occurring. The city's water-power interests had nurtured an industrial activity which provided constant incentive

to inventors. Perhaps the ablest local exponent of the use of technical scientific knowledge for practical ends was Dr. George Hand Smith, inventor in 1859 of a superior gas headlight for engines, and later of an improved method for making steel.¹⁰ The most successful promotion, that of the telegraph, focused attention on a subject of almost limitless possibilities for scientific study and speculation. The huge profits soon to reward the local promoters of Western Union were still unrealized dreams, but men with such great materialistic projects in mind could not escape a practical curiosity about the nature of electricity and other scientific marvels. Indeed, chemical lectures proved more popular than those on the natural sciences, while the mounting interest of several enterprising investors in the new mining ventures of the West directed attention to minerology.¹¹ Here, certainly, was endorsement and potential support for science, though few grasped its implications.

Yet Professor Dewey was not unmindful of the new trend, as the popular science lectures he gave or arranged indicate. He paused in his study of species in 1861 to read a paper before the Pundits on electricity. Much of Dewey's best work, however, was in botany, to which field his enthusiasm had already attracted a number of local amateurs whose collections soon rivalled his own. The development of the nursery industry provided ample scope for the practical application of such knowledge.¹² The young men Dr. Dewey inspired invaded all scientific fields, but none pressed forward with such zeal as Henry A. Ward, whose chief specialties were to be minerology and paleontology.

Henry A. Ward's colorful career was full of dramatic incidents, from start to finish, and the story of his early scientific ventures was no exception. His youthful enthusiasm for collecting geologic specimens in the Genesee gorge, alternately praised by Dewey and discouraged by his mother, enjoyed wider scope in connection with the preparation of a cabinet of minerals during school days. At Dr. Dewey's suggestion, he was sent to Williams, Dewey's own college, in 1850, but when his mother, aspiring to make him a minister, objected to his joining a geological expedition led by the science professor, young Ward gave up college. Fortunately, he was in Rochester when Agassiz delivered his scientific lectures in 1854 and thus enjoyed an opportunity to lead that famous scholar on several local excursions. The Ward family, after a dramatic interview with Agassiz, was sufficiently impressed with the dignity of science to accept the professor's proposal that Henry be sent to Harvard for further study.¹³

Ward's career at Harvard was cut short within a few months when James S. Wadsworth, dominant land owner of the Genesee Valley, invited him to go to Paris as companion and fellow student of Charles Wadsworth in the French School of Mines. That project was likewise soon interrupted by a trip to Egypt and Palestine in search of health and sun for young Wadsworth. There the two young men found adventure as well as health, but to Ward the experience gained in the collection of rare scientific specimens was most important. Their letters to the folks back home (one of them, written by Ward from the top of Mt. Sinai, was widely circulated and even read from a Rochester pulpit) opened new vistas for travel and scientific exploration. Charles Wadsworth returned in due season, but Henry Ward, having discovered a commercial market for fossils and other scientific specimens, stayed on for five years, pursuing various studies in Paris, making foraging expeditions, visiting scientists and museums throughout Europe. Finally, on his return in 1859, the solid merit of his collections and of his scientific ability won a substantial loan from his uncle, Levi A. Ward, to round out a Ward cabinet on a second, but this time brief, trip with his sister to Europe. An appointment as Professor of Natural Science at the University of Rochester awaited his return.¹⁴

Early Reactions to Darwinism

A community of amateur and professional scientists was thus developing in Rochester before the first announcement of Darwin's *Origin of Species* appeared in the *Union and Advertiser* on February 2, 1860. Just when the first copy arrived is uncertain, yet the intense interest already displayed by the Pundits in this subject assured the book a hearing, while Henry Ward could not long overlook its implications in his field. Even the Civil War failed to halt scientific developments in Rochester.

Young Professor Ward, busy arranging his geological display in a spacious room over the Rochester Savings Bank, conceived an ambitious plan to make the University of Rochester a great scientific center. Large sums had been loaned by his uncle and his grandfather, Dr. Levi Ward, one of the few remaining city founders. To Henry Ward and his scientific friends, the problem of settling these accounts presented a challenge to the city. Soon a drive was launched for \$20,000 to enable the University of Rochester to purchase the Ward cabinet, described

as the largest and most complete geological collection in America. Despite the distractions of war and the feeling of President Anderson, shared by some of the trustees, that such funds should be reserved for general college use, success crowned Ward's initial effort. Fundamental differences in educational philosophy were, nevertheless, brought to light, and Anderson's determination to oppose an over-emphasis on science was strengthened.¹⁵

Professor Ward was troubled at this time by another philosophical problem. An apparent discrepancy between his scientific knowledge and the theological traditions to which his mother and most of his associates were strongly attached prompted him to write, perhaps at Morgan's suggestion, to the latter's old friend, the Reverend J. H. McIlvaine, by this time a professor at Princeton. Only McIlvaine's brief note, which accompanied the more lengthy draft of his argument in behalf of the inspiration of the Scriptures, remains, and we cannot tell whether Ward's doubts were inspired by Lyell, whose geological views were certainly pertinent in the work of organizing the cabinet, or by Darwin, whose book may just have arrived. Nor do we find any specific statement of Ward's philosophical conclusions.¹⁶

Ward, however, expressed himself more eloquently in deeds and exhibits than in words. The university, he determined, should have a zoological as well as a geological cabinet, and, reassured by the success of his campaign for funds, he again left for Europe to gather a new set of specimens. When, on his return in September, 1863, his crates were unpacked, Rochester saw emerge, as from a Noah's ark, the most representative collection of fossil remains, skeletons and stuffed animals yet assembled in America. The prize exhibit was a stuffed gorilla, the first to be seen in the states.¹⁷

Old Professor Dewey must have had warning of his protege's sensational find, for a week after Ward's new collections were placed on exhibit, the aged Pundit read his paper, "Professor Huxley on Man and the Anthropoid Monkeys." Again his remarks are not available, and why he should have been content at this time, and in a second paper five months later, to consider the Darwinian theories at second hand, is not clear, yet it would have been too much in 1864 to expect any 79-year old scholar to step out and welcome the gorilla as an ancestor.¹⁸

What Dewey's fellow Pundits thought at the time is likewise unknown, nor can we determine whether any of them had yet read Darwin.

Morgan bought Huxley's essays *On the Origin of Species* that same month but delayed two years more before acquiring a copy of Darwin's famous volume. Morgan, however, was preoccupied with his own researches; the books which chiefly interested him at this time were Max Muller's philological treatises, the journals of missionaries, and the reports of travelers to out-of-the-way native peoples in all parts of the world.¹⁹ Young Dr. Edward Mott Moore, on the other hand, was eagerly interested in the new theory. He may have discussed it with Ward before the latter's third journey to Europe, for Ward carried with him Moore's commission to buy an up-to-date treatise on hybridity. It was December, 1864, before the scholarly physician had prepared his discourse on "Darwinian Theory as connected with Hybridity." That paper and another a year later on "Generation" displayed Moore's open-minded readiness to examine the doctrine of evolution in the light of his own special knowledge.²⁰

The only other local reactions to Darwin recorded during the sixties likewise came from scholarly physicians, both members of the Club. Dr. Henry W. Dean, perhaps the leading physician in the city and president of the State Medical Society, alluded in his annual address before the Society in 1865 to the "Darwinian theory of improvement" as "not to be lamented."²¹ A more voluble though anonymous comment had appeared in the *Democrat* a year before — a poem of seventeen verses later attributed to Dr. W. W. Ely, close friend and collaborator of Morgan. We cannot resist a brief quote from "To The Gorilla":²²

II

Are you the *key*, O Monkey, to unlock
 The sealed and scientific mystery?
 Were Apes the parents of the human stock,
 Long ere the records of primeval history?
 What countless ages did it take to span
 The ethnic chasm from baboon to man?

XVII

Gorilla! why so silent and disdainful, —
 Hast thou no power to move the stubborn jaw,
 And pour a flood of light on problems painful
 To Ethnologic schools? Thou man of straw!
 Why art thou standing here, so high, in College,
 To rack our fancies, and perplex our knowledge?

It would be interesting to know more about the behind-the-scenes discussions concerning the university in these years. Professor Ward's dream of developing a great center of natural sciences failed to enlist the support of President Anderson; indeed the latter was heard to remark on one occasion that Ward "has made the scientific department to stink."²³ Just what inspired that unusual remark would be hard to say, but it clearly revealed a strong antipathy, and may possibly have sprung from a religious revulsion to Ward's gorilla. It must have been especially galling to Anderson to see Ward's extensive displays occupying the entire third floor of Anderson Hall, the only college building yet erected. The struggling president could hardly be blamed for thinking that the \$20,000 raised to buy the Ward collection for the college might more appropriately have been given for general expenses, for the college was battling its most critical financial difficulties in this trying decade.²⁴

Henry Ward, as a member of the large Ward clan, had numerous relatives prominent in the leading Presbyterian churches to which the university looked for community support. Moreover, Ward's scientific projects made a strong appeal to investors interested in western mines and other ventures in which a knowledge of science promised practical returns. Indeed, Ward's knowledge of minerals and geological formations brought him a commission to go West as the leader of an expedition to select and then to develop a gold and copper claim for the Midas Mining Company of Rochester in 1865. Amidst difficulties that would have tried a more experienced manager, Ward found time to add to his scientific collections, to propose an independent mining venture to Hiram Sibley, and to remind that Western Union financier of the proposed scientific building which he and his friends hoped Sibley would build for the University of Rochester.²⁵

Yet President Anderson likewise had staunch friends. When an invitation to accept the presidency of Brown University threatened to take him from Rochester, a drive was launched to raise a fund adequate to insure his work in Rochester. The funds raised justified Anderson's decision to remain, but the drive failed to reach its intended goal, for Sibley was resolved to earmark his major contribution for practical education. Anderson's cool attitude towards that object permitted Ezra Cornell to persuade his former partner to build a mechanical arts building at the newly established university in Ithaca. Fortunately the contending forces within the University of Rochester ultimately reached

an agreement to accept a Sibley Hall for Rochester, to be devoted to the joint purpose of housing the Ward scientific cabinets and a sorely needed library.²⁶

Anderson had granted and frequently extended leaves of absence desired by Ward, but at one point during the heat of the controversy Dr. Edward Mott Moore found it necessary to speak up strongly in defense of the young professor.²⁷ It was Ward himself who finally severed his university ties. His heart was in collecting and restoring rare specimens, not in lecturing. Moreover, the stream of orders and visitors from distant colleges required more attention at his workshop, renamed Cosmos Hall. Ward, on his third visit to Europe, had made plaster of Paris casts of fossils he could not acquire and of the models recently constructed by museum men from the latest paleontological discoveries. From these casts, Ward's assistants were now able to supply any number of reproductions. Matthew Vassar was the first to place an order for a complete cabinet to be installed in his new college for women on the Hudson. Thus a Natural Science Establishment was developing at Cosmos Hall, making Rochester a supply center for scientific exhibits and a training center for museum men as well. When in 1869 the old workshop, still located on the campus, was destroyed by fire, most of the casts, valued a few weeks before at \$67,000, were carried to safety and Cosmos Hall was rebuilt across the street as an independent scientific venture. Soon Grove Karl Gilbert, Edwin E. Howell, and Ward's other early associates were earning reputations of their own in which Rochester could take pride.²⁸

Scientists were attracted to Rochester not only to select specimens from Ward's Cosmos Hall, but to enjoy a visit with Lewis H. Morgan. The range of the latter's correspondence had become world wide, and few contemporary students of ethnology, philology, or the early history of native peoples, are missing from his letter files. Among a succession of scientific visitors appeared Agassiz, Silliman, Asa Gray, James D. Dana, A. F. Bandelier, C. E. Chandler, Joseph Henry, Edward Hitchcock, Eben Horsford, O. C. Marsh and Jeffries Wyman, to name only a few. These associations must have proved highly stimulating, not only to Ward and Morgan, but to their assistants and scholarly friends as well.²⁹

Morgan's relation to Darwin has frequently attracted the study of able scholars. Bernard J. Stern, whose volume on *Lewis H. Morgan: Social Evolutionist* stressed the essential harmony between the ideas of

Darwin and Morgan, states nevertheless that the latter avoided the word evolution and "never emancipated himself from his theological background."³⁰ Leslie A. White, whose study of Morgan as an anthropologist has been in progress for many years, objects to this statement and notes, in a brief article on "Morgan's Attitude Toward Religion and Science," that the infrequent use of the word *evolution* in Morgan's books was quite in line with the practice of other writers of the day, not excepting Darwin himself. White finds that Morgan's break with orthodox religious beliefs was sufficient to disturb his intimate friend, J. H. McIlvaine, and that he was accepted by his friends and followers as a social evolutionist.³¹ Paul Kosok, still another careful student of Morgan, has checked the successive drafts of Morgan's most famous book, *Ancient Society*, and discovers that a noncommittal reference to Darwin and his theory, which appeared in the early drafts of the first chapter, written in 1872, was modified in later drafts and finally eliminated. Kosok concludes that Morgan, while persuaded in the late sixties, as his own concept of social evolution developed, that Darwin's theories of biological evolution were sound, did not wish to prejudice his own case or confuse the issue by endorsing Darwin.³²

Each of these scholars has much more to say on this subject than we can summarize here, but one additional bit of evidence deserves mention. Morgan's personal copies of Huxley and Darwin, still preserved at the University of Rochester, contain some interesting markings which indicate the care with which the Rochester scholar read these books. Significantly, none of the passages marked touched metaphysical aspects of the controversy. Each passage in which Morgan took a special interest dealt with a question raised by his own researches; furthermore, several of the checked paragraphs tended to support his views against those of Agassiz on species, the issue which had originally inspired his scientific endeavors.³³ In short, Morgan gave little heed to the theological implications of the new scientific hypothesis, which interested him chiefly because of its possible bearing on his own work. He did not bother to acquire a personal copy of Herbert Spencer's *Principles of Biology*, advertised in Rochester in 1866, until after his return from Europe in 1871.³⁴

The journal kept by Morgan during his trip to Europe (July, 1870, to August, 1871) is full of interest for the student of scientific developments in Rochester. Morgan visited Max Muller, the philolo-

gist, Charles Darwin, J. F. McLennan, Sir John Lubbock, Thomas Huxley, Sir Henry Maine, and finally Herbert Spencer, finding each of them already acquainted with his writings. He was courteously shown about various continental museums by professors or curators who recalled his young friend, Ward of Rochester. Morgan, who travelled with his wife and son, took meticulous notes on the buildings, manners, customs, and institutions of the areas he visited — the kind of observations he had long sought on the Indians and other native tribes. For a year, he was permitting his mind to lie fallow before commencing work on *Ancient Society*.³⁵

Back in Rochester, Morgan hastened to order Spencer's *Biology* and Wallace's *Natural Selection*. Scientific papers were dominating the schedule of the Pundit Club. Dr. Moore discoursed on "Protoplasm" and on "The Medical Profession in Relation to Natural Science." In 1875 he took up a new and significant subject, "The Transfusion of Blood." A new member, Dr. R. J. W. Buckland, a professor at the theological seminary, reviewed the controversy between "Genesis and Geology" and, in 1872, tackled the dangerous subject of "Comparative Religions." His broad views in this field did not of course spring from Darwinism, but reflected a similar intellectual climate. Dr. Robinson, head of the seminary, having likewise returned from a recent visit to Europe, read a paper on "Theology as related to the Scientific Method." That paper is missing, yet we know from other sources that Robinson, soon to become president of Brown University, was more readily persuaded by scriptural texts than by naturalistic evidence. An issue was being posed, full of explosive possibilities.³⁶

The Controversy Reaches the Public

The strife between evolution and theology did not break into the open locally until 1872. Professor Ward's gorilla may have caused a flurry of excitement in 1863 but, except for the humorous poem already quoted, no one ventured to make a public exposition of the theories it suggested. Much earnest debate must have occurred during the sixties in circles unrepresented by the Pundit Club, though no records of it have survived. The announcements of Spencer's books and of Darwin's *Descent of Man* attracted little notice.³⁷ Finally in 1872 a series of lectures by Professor W. D. Gunning brought the controversy to the public.

The Reverend Dr. Newton M. Mann, the Unitarian pastor who came from Troy to Rochester in 1870, was responsible for inviting Gunning to lecture at the Unitarian church. The lectures, which began with the geological discoveries and continued into the fields of zoology and anthropology, were extensively reported and attracted interested audiences. It was perhaps at this time that Susan B. Anthony, a member of that church, read Darwin's two books, unfortunately without recording her views.³⁸ Other hearers were more outspoken. One "E. N.," writing to the *Democrat*, attacked the "simple proofs" advanced by Gunning in behalf of Darwinism and quoted Huxley at some length to prove how hypothetical the new theories still remained. Professor Gunning answered, and both writers submitted two further letters before the argument lapsed.³⁹

No mention of Spencer appeared in the published accounts of these lectures. Yet the organization of a Spencer Club that year suggests the trend of discussion. Charles A. Dewey, son of the late Professor Dewey, Dr. Charles E. Rider, Dr. Edward Mott Moore, Winfield S. Sherman, a banker, and Robert Mathews, a self-educated business man, formed the nucleus of the club of which the Reverend Dr. Mann was for a time the only clerical member. Spencer's volumes were taken up, chapter by chapter, each member assuming responsibility for leading the discussion in his turn; most of the club sessions were held at the home of Robert Mathews in the Third Ward, the city's old cultural center.⁴⁰

Meanwhile the public controversy over Darwinism continued. A lecture in German before the Turnverein by Dr. Louis Buchner, author of *Kraft und Stoff*, presented a defense of evolution in materialistic terms. Professor August Rauschenbusch, writing for both the German and English papers, attacked Buchner's premises, while Herman Pfäfflin, principal of the Realschule, rose to his defense.⁴¹ Letters both *pro* and *con* Darwin and Spencer appeared that spring; after a lull during the summer, the controversy broke out anew with the announcement of a lecture series on science by the Reverend Dr. Nesbit at the Lake Avenue Mission. Dr. Nesbit admitted, as the series progressed, that God had used geological forces to prepare the planet for man and granted whatever time span was required, but he was not receptive to the Darwinian theory of man's origin.⁴² Bishop Haven of the Episcopal church, speaking in Rochester a week later, ridiculed the claims for evolution,⁴³ yet the opposition was characterized more by reason than

by emotion, for a learned piety had already supplanted evangelistic fervor in most Rochester churches.

Lewis H. Morgan, when called upon to address the public school teachers of Rochester at an annual institute that December, described the progress of the human race from savagery through barbarism to civilization, without, however, mentioning the controversial question. He had, it is true, written a private letter to a missionary friend the year before, admitting that his own researches had finally compelled him to abandon resistance to the Darwinian theory, yet a scholarly reserve enabled him to state his conclusions in terms free from current prejudices. No public announcement was made when Charles Darwin's sons called on Morgan during their American tour in 1872.⁴⁴

The Reverend Dr. Mann, on the other hand, saw a real advantage to be gained for religion by a candid acceptance of the evolutionary process. Newton Mann (whose father, incidentally, had been named Darwin H. Mann) had been the first preacher in America to note the religious significance of the Darwinian hypothesis in a sermon delivered at Cincinnati on the eve of the Civil War. For more than a decade he had been recurring to that theme, and his Rochester sermon of 1874 marked a significant development in his concept of an evolving soul. Darwin's theory, he declared, did not apply to the physical life alone but to all life functions; furthermore, as man became conscious of his spiritual environment and developed his potentialities in this field, the evolution of the soul occurred. The sermon was extensively reported in the press, attracting censure from at least two area correspondents, but it is important to note that these vocal critics took pains to quote contemporary scientists in support of their views.⁴⁵

The attention of most Rochesterians was focused on another problem during the next few years — the depression of the mid-seventies. When a concerted philanthropic effort in the winter of 1873-74 failed to dispel the hard times, many citizens turned their energies to an evangelistic revival of the temperance crusade. It was hardly a propitious time to discuss theories of either evolution or progress. Interest in science shifted from philosophical speculation to empirical research, and two new figures in local scientific history, Lewis Swift and Samuel A. Lattimore, emerged.

Swift was a hardware merchant who had early developed a hobby in astronomy. On warm evenings during the early seventies he could be seen peering through his home-made telescope mounted on the roof

of a cider mill near the gorge. An announcement in July, 1874, that he was the first in America to discover the approach of a new comet, brought an invitation to mount his telescope on top of the Powers Block tower, highest point in the city. By popular accord the title of Professor was conferred on the amateur astronomer, and a campaign was soon launched to provide a stronger telescope.⁴⁶

Professor Lattimore's star rose more gradually. It was in the fall of 1874, some time after his appointment as the new chemistry professor at the university, that he announced a free course of scientific lectures for workmen. The performance of practical experiments with various chemical substances attracted interest, and the addition of a lecture by Professor Swift on the eclipse of the moon proved a happy inspiration. The new City Hall was made available for these lectures in subsequent years. A useful form of popular education in science was thus provided, without, however, threatening any established canons, for controversial scientific questions were discreetly avoided.⁴⁷

Dissension within the ranks of the evolutionists may have accounted in part for their weakness during the mid-seventies. Study of Spencer's writings had revealed implications not at first suspected. The Spencer Club's deliberations had lapsed, possibly for this reason. Lewis H. Morgan was so dubious of Spencer's first books that he wrote to Darwin about them, receiving in reply both confirmation and reassurance: "I am as great an admirer (wrote Darwin) as any man can be of H. Spencer's genius, but his deductive style of putting almost everything never satisfies me, and the conclusion which I constantly draw is that 'here is a grand suggestion for many years work.'"⁴⁸ Cautious analysis rather than blind acceptance or rejection was clearly recommended, and Morgan took an active part in the discussions of the Spencer Club after its revival in the late seventies. Judging from the varied character of its members we can be assured that divergent opinions were expressed, for neither Newton Mann nor Myron Adams, a new clerical member, could have agreed with Spencer's rigid insistence that the evolutionary process should not be tampered with by social action. Perhaps in an effort to restore harmony, the club switched in its last years from an analysis of Spencer to a study of Morgan's works, a step which many serious students of anthropology had already taken.⁴⁹

The winter of 1877-1878 saw a renewal of the public attack on evolution, with Spencer now the chief target. The Reverend Joseph Cook came from Boston to deliver a series of lectures at the theological

seminary on "Life or Mechanism. Which?" The three lectures were repeated before capacity crowds at the Second Baptist Church, with young Augustus H. Strong, the new president of the seminary, presiding. Cook professed to be an evolutionist in some respects, but declared that he was an "involutionist" first, for only after God had breathed life and spirit into matter could it evolve. Spencer and Huxley, he announced, failed to explain this vital process.⁵⁰

Two weeks later another Bostonian, Professor J. H. Toohey, undertook to answer Cook's charges. A group of citizens raised a purse to enable Toohey to present his full argument in three lectures at old Corinthian Hall. Strangely enough, none of his sponsors was a member of the Spencer or Pundit Clubs, though the presence of at least two free thinkers on the list is suggestive. A visiting lecturer on physiology took pains a week later to assure his audience that biology does not pass on the question of immortality or the existence of a soul.⁵¹

The Pundits likewise turned from Darwin to Spencer in the late seventies. Young Professor Morey, a new member, read a paper in May, 1878, on "Herbert Spencer and his Predecessors," in which he maintained that the evolutionary or developmental concepts were by no means new with Spencer and his associates. Morey concluded that Spencer, by returning to the materialistic philosophy of the ancients, had abandoned the truths discovered by the philosophers of the last thousand years, thus demonstrating his folly.⁵² Augustus H. Strong likewise read a paper that year on the "Philosophy of Herbert Spencer" in which he no doubt amplified his attack on Spencer as a Humist, an idealistic materialist, as he had recently expressed it in a lecture at Colby College. Dr. Edward Mott Moore, defender of Darwin, may have taken a more sympathetic view in his paper on "Biology, Spencer, and Haeckel," read before the club a year before.⁵³

Morgan's papers throughout these years were for the most part tentative drafts of portions of his great book on *Ancient Society* or of his final volume on *Houses and House Life of the American Aborigines*. His fellow Pundits must have recognized the evolutionary implications of what he was writing, but it is doubtful whether any of them — not excepting Morgan himself — guessed the significance which two European scholars, Karl Marx and Frederick Engels, were to see in *Ancient Society*. We cannot discover that Morgan ever heard of the founders of Marxian socialism, for he died in 1881, three years before Frederick Engels quoted him extensively in a German treatise on the origin

of the family and private property. Apparently the first discussion of Karl Marx before the Pundit Club occurred in 1887 when Professor Morey considered his contribution to "Scientific Socialism."⁵⁴

Science Wins a Tentative Acceptance

Rochester reached a turning point in its attitude toward science about 1879. The organization that year of two scientific societies, each composed of amateurs and devoted to specific investigations, indicated a wider acceptance of objective techniques. The expanding usefulness of Ward's Natural Science Establishment, the popular movement to build an observatory for Professor Swift, and the increased recognition granted to science, both at the university and in the public schools, dispelled doubts and vindicated the pioneers. Tremulous voices could still be heard, warning of the dire consequences to be expected if old traditions were abandoned, but as the years passed, leading ministers discovered merits in the evolutionary doctrine, while the public, becoming increasingly indifferent to the dangers of science, learned finally to see it as the hope of the future.

Ward and Swift shared the scientific spotlight in Rochester during the late seventies and early eighties. Professor Ward's decision to install a natural science exhibit at the Centennial Exposition in Philadelphia had established his fame as a popular educator of the first rank. His fellow Rochesterians saw Cosmos Hall expand into a group of nine busy shops in which museum displays for a half-dozen colleges were under preparation. A news account of Ward's return from a 21,770-mile trip in 1877 was scarcely forgotten before another told of his new restoration of the mammoth. Ward tackled anything—a giraffe, an hippopotamus, even Barnum's famous elephant, Jumbo, though the task of preserving Jumbo's hide after it was brought to Rochester proved almost too much for Ward's staff. There was no better training school in the country for taxidermists or museumologists, as the careers of Carl Akeley and William T. Hornady were soon to demonstrate.⁵⁵

Professor Swift's achievements were no less thrilling. Comets had been rare, mysterious, and somewhat terrifying phenomena to the average citizen before the Rochester hardware merchant began to discover two or three a year. The arrival of successive gold medals from an observatory in Vienna supplied proof enough for his dubious neighbors, and when that supply of gold medals was exhausted, H. H.

Warner (an enterprising Rochester industrialist who had recently switched from the manufacture of iron safes to the promotion of Warner's Safe Liver Cure) stepped forth to offer a gold medal plus a \$200 prize to the discoverer of each new comet and undertook to erect a \$100,000 observatory on East Avenue for Professor Swift. The Warner observatory, its telescope equipped with a 16-inch lens, fourth largest in the country, was opened in 1883, the first in America to admit the general public. Professor Swift's days as a discoverer of comets were almost over; his career as a serious cartographer of the heavens was just begun.⁵⁶

The women of Rochester had taken little public interest in science prior to 1879 when Miss Grace Anna Lewis of the Academy of Natural Science in Philadelphia came to Rochester to deliver a series of lectures on science. Inspired by this demonstration of feminine leadership, Dr. Sarah R. A. Dolley, the first woman to practice medicine in Rochester, invited a group of friends to her home that March to organize the Rochester Society of Natural Sciences. Dr. Anna H. Searing and Dr. Evaline P. Ballintine became active members. Mrs. Mary E. Streeter read the first paper on "The Migration of Birds" which was followed a month later by Miss Sarah O. Peck's paper on "Frogs and their Allies." A few men joined the society, which numbered fifty by 1884, but the women, led by Dr. Dolley, continued to dominate its activities. Three creditable papers were published as *Transactions* and at least two *Reports* were printed before the society disbanded.⁵⁷

Meanwhile the Rochester Microscopical Society, founded in January, 1879, a few months before the Natural Science Society was organized, had grown into the Rochester Academy of Science, incorporated in 1881. Dr. Charles E. Rider and other members of the Spencer Club took the lead, in collaboration with Professor Lattimore, the first president of the Microscopical Society. Edward Bausch of the Bausch and Lomb optical firm which undertook to build microscopes at this time, was an active member. The trend toward scientific specialization was evident when the academy organized sections on botany, ethnology, astronomy, taxidermy and photography as well as microscopy. Each section met separately to discuss and promote its special interests, and all gathered at the annual receptions of the academy, held for many years in the Reynolds Arcade. Elaborate exhibits displayed the collections of the more enthusiastic members. Thus in 1883, each of the sixty members of the Microscopical Section displayed slides prepared with his own

microscope, while other sections exhibited photographs (George Eastman had commenced to manufacture dry plates in 1881, his first camera did not come on the market until 1888), collections of plants, mounted insects or birds, and other products of the year's effort. More than a thousand visitors assembled to examine the displays.⁵⁸

It would be difficult to overestimate the importance of the Academy of Science in its early years. Encouragement was given to individuals in all scientific fields, even to those who raised philosophical questions or battled doctrinaire traditions. Both Myron Adams and Newton Mann were honored by election as president, and Robert Mathews, who likewise held that post one year, devoted his annual address to an exposition of Spencer's philosophy.⁵⁹ Yet the prevailing atmosphere was one of detached scientific investigation, rather than philosophical speculation or debate. When in 1884 the American Society of Microscopists held its annual convention in Rochester, the Microscopical Section of the local Academy was hailed as the largest and most active organization of its kind in America, while the Academy was praised for its excellent work.⁶⁰

When the Spencerians disbanded in 1882, after the death of Morgan had removed the respected arbiter of their discussions, most of those who were not already members of the Pundit Club determined to organize a new dinner club on that model, taking the name Fortnightly. One of its founders and most faithful members was Robert Mathews, a hardware merchant whose zeal for philosophical speculation concerning science rivaled Swift's enthusiasm for astronomy. Mathews was self-taught, but it had been his good fortune to discover congenial fellow students among the Spencerians and a learned mentor in Morgan. Most of his papers during the first two decades of the Fortnightly Club were devoted to the analysis of Spencer's doctrines and those of his followers or critics. It would be interesting to know how he appraised the argument between Spencer and Lester F. Ward, whose *Dynamic Sociology* supplied the topic for Mathews in 1884. Apparently several of the Fortnightly members were keenly interested in this new issue, for the titles chosen by Jonas P. Varnum, William T. Brown, William E. Hoyt, and Dr. John F. Whitbeck approached this subject again and again. The natural sciences were attracting less interest, as in the Pundit Club, but the emerging social sciences, or at least many of the problems with which they dealt, received more attention here than from the older Pundits.⁶¹

While a few alert minds were passing on to new issues, fundamentalist theologians were fighting a rear-guard action to cover their retreat in Rochester churches. The trial of Myron Adams for heresy in 1880 was symbolical. The Ontario Association, alarmed over his failure to preach everlasting punishment, voted to expel him from its Congregational fellowship. Nevertheless, Plymouth Church stood loyally by its scholarly pastor for another sixteen years, thus encouraging the press to give his sermons the fullest coverage accorded any preacher during the period.⁶² And in 1881, when the British-American Commission (aided by two scholarly professors of the Rochester Theological Seminary) completed its revision of the English text of the Bible, the fact that the St. James version could have been mistaken, even in small points, came as a surprise to many and served to weaken the force of those who insisted on a literal interpretation of the Scriptures.⁶³

When in 1882 evolution was frankly espoused as God's method of creation by Dr. William H. Platt, the new rector of St. Paul's Episcopal Church, critics arose to denounce him both from the pulpit and the scorner's bench.⁶⁴ Nevertheless the wider dissemination of evolutionary doctrine was evidenced that same year by a long and favorable article in the student paper issued at the Free Academy, as the public high school was known; moreover, when the senior class wished to express its appreciation for the instruction received from Professor Forbes (incidentally a leading member of the Academy of Science) it presented him on his birthday with a complete set of Darwin's books.⁶⁵

Rochester played host to a freethinkers convention the next year, with thirty local citizens registering as members. A debate between T. B. Wakeman, exponent of freethought, and the Reverend Thomas Mitchell, holder of a Methodist license, attracted wide attention, though the arguments, as printed by the self-confident spokesmen themselves, were not particularly illuminating. Wakeman quoted both Spencer and Ward in his support, while Mitchell identified freethought with evolution and found chief comfort in the absurdity of supposing the earth to be 500,000,000,000 years old.⁶⁶

A qualified recognition of evolution was becoming respectable. Even the widely famous Henry Ward Beecher, his hair grown white and thin, assured a Rochester audience that he believed evolution to be God's method of creation. Another speaker found evidence of a belief in evolution in one of Emerson's essays. Few of the several proponents

of the doctrine could agree, however, upon an adequate statement of the case. Dr. Platt attacked both Beecher and Bob Ingersoll, who likewise came to Rochester early in 1885. As late as 1888, when Augustus H. Strong compiled a series of lectures for publication, several addresses of the previous decade, in which he had sharply attacked Spencer and his fellows, were included.⁶⁷ Yet Myron Adams published *The Continuous Creation* in 1889;⁶⁸ and David J. Hill, who came to Rochester as president of the university that year, was recognized as a student of science who had previously issued a book in which the evidence for and against evolution was objectively treated.⁶⁹

Moreover, the advance of science was becoming evident in practical as well as theoretical fields. George Eastman had employed Professor Lattimore's young chemical assistant, Henry M. Reichenbach, Rochester's first full-time industrial research scientist, in 1886. The success of his search for a practical photographic film had proved so profitable by 1890 that Eastman began in that year to expand his research staff and soon an industrial research laboratory was established, one of the first in the country.⁷⁰ The Reynolds Memorial Building, given to supply Professor Lattimore with an adequate chemical laboratory, was opened in the late eighties; the library collections passed the 20,000 mark in this period, and funds were provided for a professorship of "history and political and economical science."

By 1900, when the "Events of the Passing Century" were under review, the development of the theory of evolution and the advance of science were hailed in the local press as among its most salient features. Opinions were by no means unanimous, but the inductive scientific method had gained respectability without, however, shattering the community's staunch religious character. Its leading theologians were successfully absorbing the newly discovered facts of science, thus expanding and enriching their philosophical concepts, just as educators before them and now industrialists and other practical folk were doing. A genuine contribution had already been made by Rochester scientists—a foretaste of many more remarkable developments in the future.⁷¹

NOTES

1. F. DeW. Ward, ed., *Churches of Rochester* (Roch. 1871), passim; Alice T. Sutton, "Private Libraries in Rochester," *Rochester History* VII, No. 2, pp. 2-8.
2. *Democrat*, Feb. 1, 1837; Feb. 18, 1840; Dec. 23, 1843; *Dictionary of American Biography* V: 267-268; W. M. Smallwood, *Natural History and the American Mind* (New York, 1941), pp. 212; Blake McKelvey, *Rochester, the Water-Power City* (Cambridge, 1945), pp. 268-269.
3. *Union*, Jan. 18, 19, 25, Feb. 1, 1854; *Dem.*, Jan. 13, 27, 1855; Jan. 31, Oct. 22, Nov. 18, 1856; *Dem. & Amer.*, Jan. 5, Dec. 3, 1858; Rochester Athenaeum and Mechanics Association, *Catalogue* (Rochester, 1854); McKelvey, *Water-Power City*, pp. 345-346.
4. William C. Morey, "Reminiscences of the Pundit Club," R. H. S. *Publications* II: 99-126, see also pp. 37-38 and passim.
5. Dewey's papers, as listed in *The Club: 1854-1937* (Rochester 1938), in addition to that mentioned above, reveal the intensity of his concern: "A Dissertation on Species," June, 1856; "The Permanence of Species in the Animal Kingdom," Dec. 1856; "Agassiz's Theory of the Varieties of Man," Nov. 1857; "The Classification of Animals by Professor Agassiz," Feb. 1858; "Climatology," June, 1858; "Species," Nov. 1859; "Species," Nov. 1859; "Species," Feb. 1860; "Glaciers," Nov. 1860; "Does Electricity Consist of One Fluid or Two?" May, 1861; "Agassiz's Essay on Classification," Oct. 1862; "The Position of Man in the Present Zoological Classification," Jan. 1863; "Professor Huxley on Man and the Anthropoid Monkeys," Oct. 1863; "Review of Lyell's Antiquity of Man," Oct. 1864. Age compelled him to drop out in 1865.
6. *The Club*, p. 52; see L. H. Morgan, "Agassiz's Theory of the Origin of the Human Race," MS. in Morgan's Papers, University of Rochester.
7. Bernard J. Stern, *Lewis Henry Morgan; Social Evolutionist* (Chicago, 1931), p. 73.
8. L. H. Morgan, "Agassiz's Theory of the Origin of the Human Race," Morgan Papers; *The Club*, p. 54-55.
9. Stern, *Lewis H. Morgan*, pp. 73-83; *Circular in Reference to the Degree of Family Relationships among different Nations* (Washington, 1860); see also the letters for these years in Morgan Papers.
10. *The Smith Light* (Rochester, no date); *Democrat and American*, Nov. 4, 1859; Oct. 25, 1860; Barton's Obituaries, Scrapbook II: 29.
11. These interests appear constantly in the Morgan and Ward collections at the University of Rochester and in the Reynolds collection at the Rochester Public Library and the Freeman Clarke collection of Mrs. Buell Mills.
12. Florence Beckwith, "Early Botanists of Rochester and Vicinity," *Proceedings of the Rochester Academy of Science* V: 39-53; Blake McKelvey, "The Flower City: Center of Nurseries and Fruit Orchards," R.H.S. *Pub.* XVIII: 121-169; Chester W. Seelye, "A Memorial Sketch of Chester Dewey," *Proceedings of the Rochester Academy of Science* III: 182-184.
13. Roswell Ward has generously permitted the author to read and use the manuscript of his biography of Professor Henry A. Ward, soon to be published by the Rochester Historical Society.
14. Roswell Ward, MS.; *U.&A.*, Sept. 10, 13, 1859.
15. Roswell Ward, MS.; *U.&A.*, July 19, Sept. 18, 1862.
16. J. H. McIlvaine to Henry A. Ward, Princeton, July 24, 1861, Ward Papers, Univ. of Roch.
17. Roswell Ward, MS.; *U.&A.*, April 9, Sept. 21, Oct. 7, 1863.
18. *The Club*, p. 58.
19. Morgan's Catalogue of his Library, Morgan Papers.

20. *The Club*, p. 59; Edward Mott Moore to Ward, Rochester, August 14, 1863, Ward Papers.
21. New York Assembly Documents (1866), No. 133, p. 8.
22. *D.&A.*, March 19, 1864. See also Bert J. Loewenberg, "Darwinism comes to America, 1859-1900," *Mississippi Valley Historical Review*, December, 1941, pp. 329-368, for a discussion of the reactions of the country at large to Darwin in this period. Professor Loewenberg treats more specific aspects of this subject in "The Reactions of American Scientists to 'Darwinism,'" *American Historical Review*, XXXVIII (1933), pp. 687-701.
23. I. Orton to Ward, Brighton, Apr. 12, 1867, Ward Letters.
24. Roswell Ward, MS.; Edward Mott Moore to Ward, Rochester, July 31, 1867, Ward Letters.
25. Roswell Ward, MS.; Henry A. Ward to Hiram Sibley, Virginia City, Montana, July 12, 1865, Ward Letters.
26. A. C. Kendrick, *Martin B. Anderson* (Philadelphia, 1895), pp. 154-158; *D.&C.*, Feb. 13, 1872.
27. Edward Mott Moore to Henry Ward, Rochester, July 31, 1867, Ward Letters.
28. Henry A. Ward, *Catalogue of Casts of Fossils* (Rochester, 1866); Roswell Ward, MS.; *Dem.*, Jan. 27, 1867; *Chronicle*, Oct. 11, 1869; *D.&C.*, July 13, 1872; Jan. 4, 1875.
29. See the correspondence files of both Morgan and Ward.
30. (Chicago, 1931). See especially pp. 22-23.
31. *American Anthropologist*, Vol. 46 (1944), pp. 218-230.
32. I am greatly indebted to Paul and Rose Kosok who have generously shared with me the fruits of their researches in the Morgan manuscripts at the University of Rochester and elsewhere.
33. See Morgan's personal copies of these two books.
34. See Morgan's inventory of his library, MS.; *U.&A.*, Apr. 14, 1866.
35. Leslie A. White, "Extracts from the European Travel Journal of Lewis H. Morgan," *R.H.S. Pub.* XVI: 221-389, especially pp. 243, 338-339, 367-375.
36. *The Club*, pp. 62-64; A. H. Strong, "Church History and One Who Taught It," *Philosophy and Religion* (New York, 1888), pp. 337-343; E. H. Johnson, ed., *Ezekiel G. Robinson: An Autobiography with Supplement* (New York, 1896), p. 182.
37. *U.&A.*, Nov. 17, 1864; Apr. 14, 1866; Apr. 1, 1873.
38. *D.&C.*, Mar. 20, 28, Apr. 3, 1872; Ida Harper, *Susan B. Anthony I*: 198.
39. *D.&C.*, Apr. 4, 5, 7, 11, 1872; *U.&A.*, Apr. 1, 3, 1872.
40. John R. Slater, "The Spencer Club" MS., Univ. of Roch.
41. *D.&C.*, January 23, 1873; *U.&A.*, Feb. 20, 1873; Herman Pfafflin, *Hundertjahrige Geschichte* (Rochester, 1917), pp. 81-82.
42. *U.&A.*, April 1, May 19, 1873; *D.&C.*, Dec. 8, 1873.
43. *U.&A.*, Dec. 19, 1873. See also J. H. Whitmore, *Evidences of the Antiquity of Man* (Rochester, 1874).
44. *D.&C.*, Dec. 8, 1873; Charles Darwin to L. H. Morgan, Kent, June 14, (1872); L. H. Morgan to Lorimer Fison, Rochester, Sept. 20, 1872; Morgan Letters.
45. *U.&A.*, Feb. 24, 28, March 9, 1874; "Newton Mann," *Dictionary of American Biography*, XII: 246-247.
46. *D.&C.*, July 15, 20, Oct. 26, 1874.
47. *D.&C.*, Oct. 26, 1874; Jan. 23, March 13, Oct. 16, 1875; March 13, 1880.
48. Charles Darwin to L. H. Morgan, Kent, July 9, (1877), Morgan Letters.
49. Slater, "The Spencer Club," *U.&A.*, Dec. 11, 1879. See Leslie A. White, *Pioneers in American Anthropology*, (Albuquerque, 1940) 1:13-25.
50. *Express*, Nov. 9, 10, 16, 17, 1877.
51. *Express*, Dec. 3, 5, 8, 18, 1877.
52. William C. Morey, "Herbert Spencer and His Predecessors," MS., Univ. of Roch.; see also Morey's "Herbert Spencer in the Light of History," *Baptist Quarterly Review* (1883), pp. 279-290.

53. *The Club*, pp. 66-67; Augustus H. Strong, *Philosophy and Religion: A series of Addresses* (New York, 1888), pp. 39-57, 75-89.
54. *The Club*, pp. 65-70; Frederick Engels, *Origin of the Family, Private Property and the State*. This is an English edition of the fourth German edition, the first appearing in 1884. See also Stern, *op. cit.*, pp. 175-176, 188.
55. Roswell Ward, MS.; *D. & C.*, Jan. 26, April 7, 1876; May 28, 1877; July 8, 1878; Dec. 1, 1880; June 20, 1881; Nov. 29, 1885; William T. Hornady, "The King of Museum Builders," *The Commercial Traveller's Home Magazine* VI (1896), pp. 147-159; Mary Akeley, *The Wilderness Lives Again* (New York, 1940), pp. 15-27.
56. *D. & C.*, Feb. 26, 1883. A fuller account of Professor Swift is being prepared for an early issue of *Rochester History*.
57. Rochester Society of Natural Sciences, *Annual Report* (Rochester, 1880), (Rochester, 1885); *ibid.*, *Transactions* (1880), (1881), (1882).
58. *D. & C.*, Jan. 28, 1879; May 16, July 22, 1881; Oct. 10, Dec. 4, 1882; Jan. 9, June 12, 1883; Herman LeRoy Fairchild, "History and Work of the Rochester Academy of Science," *Proceedings of the Rochester Academy of Science* III: 320-339; Carl W. Ackerman, *George Eastman* (Boston, 1930), p. 42.
59. *D. & C.*, Oct. 10, 1882; Jan. 9, 1883; June 9, 1885.
60. *D. & C.*, August 20, 23, 1884. See also W. Stephen Thomas, *The Amateur Scientist* (New York, 1942), for a discussion of the cultural importance of these amateur scientific societies.
61. Compare the titles listed in *The Club*, with those listed in *The Fortnightly* (Rochester, 1907). See the provocative discussion of this important controversy in Richard Hofstadter, *Social Darwinism in American Thought: 1860-1915* (Philadelphia, 1944).
62. *D. & C.*, Dec. 15, 28, 1880; Jan. 2, 3; Feb. 6, March 30, 31, 1881; E. P. Adams, *In Memory of Myron Adams* (Rochester, 1896).
63. *D. & C.*, March 6, May 24, 1881.
64. *D. & C.*, Nov. 20, Dec. 11, 13, 1882.
65. *The Student*, May 22, June 5, 1882.
66. T. B. Wakeman, *Evolution or Creation: An Address delivered before the Freethinkers Association of New York at Rochester, August 31, 1883* (New York, n.d.); Reverend Thomas Mitchell, *Christianity Defended before the Freethinkers Association of New York assembled in convention at Rochester, August 30, 1883*, (Brooklyn, 1883); *D. & C.*, Aug. 29, 30, 31, Sept. 2, 3, 4, 1883. See also, Sidney Warren, *American Freethought: 1860-1914* (New York, 1943), pp. 222-224.
67. Myron Adams, *The Continuous Creation*, (Boston, 1889); *ibid.*, *Creation of the Bible* (Boston, 1892).
68. Strong, *Philosophy and Religion*, especially IV and VI.
69. D. J. Hill, *Lecture Notes on Anthropology* (Lewisburg, Pa., 1885).
70. Ackerman, *George Eastman*, pp. 56-63, 327.
71. Samson Scrapbook, No. 92, pp. 5-10; No. 93, p. 28.

